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Author(s)	Ikema, Makoto
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By MAKOTO IKEMA\*\*

Consider a final good  $X$  which is produced by two factors of production, namely, the intermediate good  $M$  and a bundle of all other factors  $V$  including the primary factors. Production technology is assumed to be characterised by fixed proportions.<sup>1</sup> Hence we define units such that one unit of output  $X$  requires one unit each of two factors,  $M$  and  $V$ .

<sup>1</sup> This assumption certainly limits the validity of our analysis. It should be stressed, however, that we are concerned with the short-run effects not allowing for any substitution between  $M$  and  $V$ .

First of all let us assume that the supply of  $V$  is perfectly elastic. In Figure 1 quantities of  $X, M$  and  $V$  are shown along the horizontal axis and their prices along the vertical axis. By the assumption of perfectly elastic supply of  $V$ , the supply schedule for  $V$  is drawn as a horizontal line  $S_v$ . When all markets are perfectly competitive, the supply schedule for  $X$ , the curve  $S_x$ , is the vertical sum of supplies of  $M$  and  $V$ . The demand schedule for  $X$  is represented by the curve  $D_x$ . The derived demand schedule for  $M$ , the curve  $D_m$ , is constructed as the vertical difference between demand for  $X$  and the supply of  $V$ . The competitive or undistorted equilibrium is achieved at the point  $E$ ; the price of  $X$  is  $XE$  of which  $MA$  is paid to one unit of  $M$  and  $AE (=OV)$  to that of  $V$ , so that  $XE = MA + AE$ .

Now suppose that there is only one producer of the final good  $X$ , while the other markets are still competitive.<sup>2</sup> The pure monopolist  $X$  produces the quantity of  $X$  which brings his marginal revenue equal to his marginal cost in order to maximize his profits. In Figure 1 the marginal revenue schedule for the monopolist  $X$  is shown by the curve  $MR_x$ , so that he produces  $OX'$  of  $X$  for which the demand price is  $X'E'$ . The unit cost of producing  $OX'$  is  $X'B'$ , of which  $M'A'$  is paid to one unit of  $M$  and  $A'B' (=OV)$  to that of  $V$ . Thus  $B'E' (=X'E' - X'B')$  is the monopolist profit per unit of  $X$ . This is a very familiar situation.

But let us assume monopoly in the production of intermediate good  $M$  instead of final good  $X$ . In this case marginal revenue in production of  $M$  is equated by the monopolist  $M$  with his marginal cost. We can derive the marginal revenue schedule for the monopolist  $M$  from the derived demand schedule for  $M$ . This schedule is depicted as the curve  $MR_m$  in Figure 1. Thus the monopolist  $M$  supplies  $KA'$  of  $M$  to the final good producers at the price of  $M'C'$ . Note that  $KA' = JB'$ ;<sup>3</sup> the supply of  $M$  under monopoly in  $M$  is exactly the same as that under monopoly in  $X$ . The price  $M'C'$  of  $M$  for  $OM'$  is greater than  $M'A'$  by  $A'C'$ , the monopolist  $M$ 's profit per unit of  $M$ . The presence of monopoly profits in the production of  $M$  leads the supply schedule for  $X$  to shift upward: the supply price of  $X$  for  $OX'$  is now the sum of  $M'C'$  (unit price of  $M$ ) and  $A'B' (=OV)$  the unit price of  $V$ , which is equal to  $X'E'$  because  $A'B' = C'E' = OV$ . In other words the competitive producers of  $X$  can just cover the extra costs resulting from the distortion of monopoly in  $M$ .

From the argument based on the analysis in Figure 1 we can conclude that if the supplies of all other factors of production are perfectly elastic, there exists an equivalence to the final good consumers between monopoly in the production of final good and monopoly in the production of an intermediate good.<sup>4</sup>

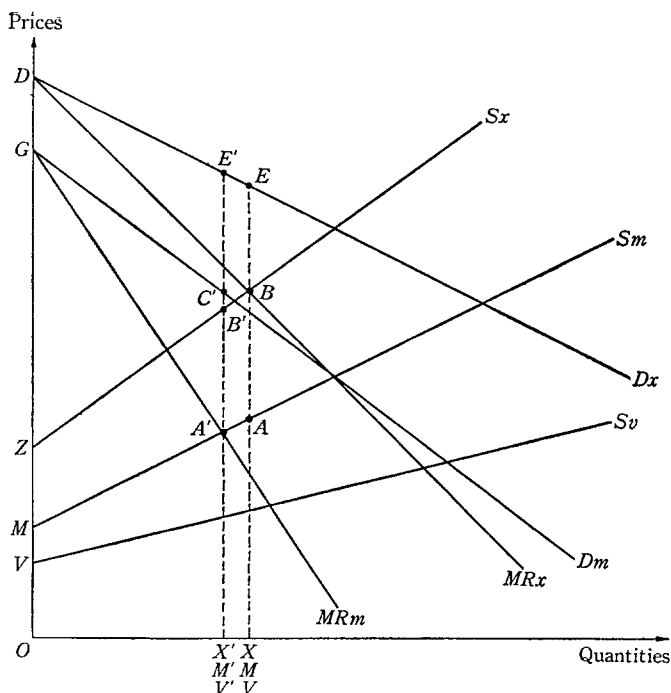
When the assumption of infinite supply elasticity of  $V$  is removed, however, the above conclusion needs to be modified. Consider Figure 2, the case where the demand curve for  $X$  and the supply curve for  $M$  are identical with those in Figure 1, while the supply curve for  $V$  is now not horizontal but upward sloping. Accordingly the other curves will shift in relation to the change in the supply schedule for  $V$ . It is not necessary to explain what every curve in Figure 2 implies. In the case depicted in Figure 2 the following conclusion

<sup>2</sup> We assume that  $M$  and  $V$  can also be used for other sectors of the economy preventing the monopolist  $X$  from becoming the monopsonist as well.

<sup>3</sup> Because the assumption that the supply of  $V$  is perfectly elastic, the curve  $S_x$  is parallel to the curve  $S_m$  and also the curve  $D_x$  to the curve  $D_m$ . Since  $GD = MZ$ ,  $\Delta MGA' = \Delta ZDB'$ . Hence  $KA' = JB'$ .

<sup>4</sup> The same conclusion can be obtained when supplies of both  $M$  and  $V$  are perfectly elastic.

FIG. 2



obtains. When the supply schedule for  $V$  is upward sloping, the equilibrium quantity  $X$  is greater in the presence of monopoly in final goods production than in the presence of monopoly in intermediate goods production  $M$ ; in the former case the amount of  $X$  is  $OX$  while the latter case it is  $OX'$  as shown in Figure 2. Correspondingly the price of  $X$  is  $XE$  in the case of monopoly in final good production but  $X'E'$  in the case of monopoly in intermediate good. For final good consumers, therefore, the former case is preferred to the latter case.<sup>5</sup>

The analysis above may give some insight into the effects on final good markets of monopoly organised by the principal countries exporting raw materials. Suppose that there are two groups of countries, one producing and exporting only a raw material ( $M$ ) and the other producing and exporting only a final good ( $X$ ). As a result of the setting up of a monopolist organisation by  $M$  exporting countries, monopolist profits follow, on the one hand, but the final good  $X$  is obtained at a higher price, on the other. It is worth noting that, if  $M$  exporting countries can afford to buy the final good  $X$  at prices only below  $X'E'$  in Figure 1, their monopolist organisation will limit supplies of the final good  $X$ .

Finally, it should be noted that this analysis is partial equilibrium, and that conclusions obtained might need to be qualified in a general equilibrium framework.

<sup>5</sup> The same conclusion can be reached on the assumption that the supply schedule for  $V$  is upward sloping while the supply schedule for  $M$  is perfectly elastic.

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